DOCUMENT RESUME

ED 348 938 IR 015 579

AUTHOR Crooks, Beryl
TITLE The Potential of Non-Broadcast Television Technologies for Learning and the Implications for Educational Television Design and Research.
INSTITUTION Open Univ., Walton, Bletchley, Bucks (England). Inst. of Educational Technology.
REPORT NO PLUM-P-4
PUB DATE 90
NOTE 16p.; A product of the Programme on Learner Use of Media. Paper presented at the Tel Aviv Seminar on Educational Television Broadcasting Research in the Nineties (Tel Aviv, Israel, March 1990).
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Distance Education; Educational Research; *Educational Television; Foreign Countries; Futures (of Society); Higher Education; *Instructional Design; Learner Controlled Instruction; Teaching Methods; Television Research; *Videodisks; *Videotape Cassettes; Videotape Recordings

ABSTRACT

The teaching potential of videocassettes and videodiscs are reviewed, together with an indication of when mass access is likely to rival that of broadcast television. It is argued that videocassettes and videodiscs, with their focus on small groups of viewers and interaction, have far ranging consequences for instructional television design, and that the challenge to broadcast television from new television technologies lies in the control learners can exert over their viewing of the television material. Since the immediate challenge is presented by videocassettes, the implications that the characteristics of this technology have for television design are explored. The changes to broadcast educational television that are likely to result from the impact of the videocassette medium within the next decade are explored by means of a brief scenario. (Author/DB)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED348938

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☐ This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

BEST COPY AVAILABLE

"PERMISSION TO REPRODUCE THIS MATERIAL IN **OTHER THAN PAPER COPY** HAS BEEN GRANTED BY

Don J. Whitehead

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

Programme on Learner Use of Media

The Programme on Learner Use of Media has been established to develop an understanding of students' use of and learning from combinations of educational media (both current and anticipated) in distance education. Our specific aims are:

> To maintain and improve the quality of teaching and learning being carried out through combinations of media in the University.
>
> To ensure that the University maintains an appropriate balance between media with respect to teaching effectiveness, learners' strategies for media use, the logistics of use and relative costs.
>
> To develop a knowledge base to support research and policy making in respect of media use.

Members of PLUM are:

Diana Laurillard	(3311)
Beryl Crooks	(2606)
Adrian Kirkwood	(2401)
Josie Taylor	(5965)

Secretary: Hansa Solanki (2909)

Programme on Learner Use of Media
Paper No. 4

THE POTENTIAL OF NON-BROADCAST TELEVISION TECHNOLOGIES FOR LEARNING AND THE IMPLICATIONS FOR EDUCATIONAL TELEVISION DESIGN AND RESEARCH

Beryl Crooks

Abstract

The teaching potential of video-cassettes and video-discs are reviewed, together with an indication when mass access is likely to rival that of broadcast television. Since the immediate challenge is presented by video-cassettes, the implications that the characteristics of this technology have for television design are explored. The changes to broadcast educational television that are likely to result from the impact of the video-cassette medium within the next decade are explored by means of a brief scenario.

(Paper presented at Tel-Aviv Seminar on *ETV Broadcasting Research in the Nineties*, Tel Aviv, Israel, March 1990)

The potential of non-broadcast television technologies for learning and the implications for educational television design and research.

Beryl Crooks
Institute of Educational Technology, The Open University, March 1990

This paper was presented to the Tel Aviv Seminar on ETV Broadcasting Research in the Nineties sponsored by the European Broadcasting Union. Tel Aviv, Israel, March 1990.

Abstract

The teaching potential of videocassettes and videodiscs are reviewed, together with an indication when mass access is likely to rival that of broadcast television. Since the immediate challenge is presented by videocassettes, the implications that the characteristics of this technology have for television design are explored. The changes to broadcast educational television that are likely to result from the impact of the videocassette medium within the next decade are explored by means of a brief scenario.

Educational television designers will of necessity, respond to the challenge of non-broadcast television technologies in the next decade. A non-broadcast television technology such as videocassette or videodisc offers the opportunity of interaction with television material to the individual viewer or a small group of viewers. In contrast, broadcast television, whether by ground-based transmission, cable or satellite, is aimed at large audiences. Although, in theory, two way interaction is possible on cable or satellite, if all subscribers interacted with the television material at once, the result would be chaotic. Thus in practice, cable and satellite must be categorised as broadcast technologies which leaves videocasssette and videodisc, with their potential for interaction, having far-ranging consequences for educational television design.

Review of non broadcast television technologies

Just how much of a threat do alternative technologies pose to broadcast educational television? This question can be considered from two angles. Firstly, whether alternative television technologies have the potential to become major teaching tools and secondly at what point in time mass access to these new technologies is likely to rival that of broadcast television.

The challenge to broadcast television from new television technologies lies mainly in the control learners can exert over their viewing of the television material. The problems presented by broadcasts in this respect are summarised below:

- Broadcasts cannot be stopped if the student has missed a point, or, be reviewed, which makes comprehension and mastery learning difficult.

- The commentary or story line, which undertakes all the analysis of the audio-visual evidence on behalf of the student, discourages critical analysis.

- The pace is set for all students irrespective of background knowledge or individual ability.

- Students must view programmes when they are transmitted, regardless of their progress through a course or the convenience of the transmission time. Group viewing and discussion is difficult to arrange.

In order to appreciate the degree to which both videocassettes and videodiscs increase the control of students over their learning, it is helpful to distinguish the two technologies, without going into technical detail.

Tape - is linear, therefore users have to spool backwards and forwards to find bits they want. The "reading" of the tape is done mechanically which causes wear and tear on the tape and the tape heads.

Discs - are possible to access almost instantaneously. Laser systems use light to read the disc so disc life and quality are not affected by constant use. The storage capacity of discs is enormous.

Both videocassettes and videodiscs have the potential to become major teaching tools in similar respects. The implications for teaching using television stored on tape are as follows:

- The linear nature of tape makes access to different parts slow, but possible. Winding forwards and backwards can be tedious and may discourage students from doing it.

- Videotape can be interfaced with a micro-computer. Electronic pulses can be laid along the tape so the computer can route students to different parts. Thus the computer can individualise learning by a combination of feedback and route guidance.

- The stop/start facility on videocassette machines makes student interaction and integration with other media possible. For example, a student can use a videotape for guidance while performing an experiment.

- There is a freeze-frame facility on most videocassette machines, but, because of the mechanical arrangement there is considerable picture jitter. Still, students can hold the frame until they have grasped all the information it contains.

- The replay facility means that dense or difficult content can be viewed more than once.

- Fast forward and slow motion search facilities allow students to skip bits they find boring!

- Short, unrelated sequences can be packaged together because there is no need for a continuous narrative story line to fill a programme slot. So, each sequence can fit specific educational needs.

- High percentages of the population in developed countries own a videocassette recorder at home. Thus the technology is "user friendly". If students are home-based they can slot the television into their study schedules when it is convenient.

These implications may be compared with the teaching potential of television stored on disc. The most widely used technology is the videodisc but a recent technological innovation has adapted compact discs which were once used for recording only audio material to record video material too. Thus television material can be played back on either videodisc playback machines or compact disc/video machines. As far as the learner is concerned, the features of television viewed on a disc player, remain the same.

- The disc record of audio-visual material allows very fast access to different parts, thus control of what to watch, in which order, moves from the producer of the programme to the learner.

- Access can be computer controlled through an "in board" computer, or through an interface with a microcomputer. The computer can speedily access a massive audio visual data base or, individualise learning by feedback and route guidance.

- Still frames can be presented with no picture jitter. Thus students can analyse the detail of a high quality picture, for example, the brushwork on a painting.

- Control of frame advance and frame reverse is very precise. This places control of how long and how many times to watch entirely in the hands of the learner.

- Since both still pictures and sequences of moving pictures of varying length can be packaged together, a disc can act as an audio-visual database. In my view its most successful educational applications have been for this purpose.

- Contrary to forecasts five years ago, videocassette players are the home video player of choice in developed countries, not disc players. Disc

players combined with computers need a period of familiarisation. Specially equipped study centres must be provided.

- Since speed of access and control of search facilities are more refined on disc players, they allow students more control than videocassettes over learning. However, a videocassette machine can do many of the things a disc player can do, even if less effectively.

The teaching potential of new television technologies is not a sufficient factor to present a challenge to broadcast educational television. Pedagogic issues must be considered in the context of other factors such as cost and convenient access. Educational broadcasting has "piggy-backed" on the entertainment aspect of broadcasting. When mass access to new television technologies rivals that of broadcast television, then they will present a serious threat.

The 1990's will be the "decade of the videocassette" - a contention that is supported as follows:

Figure 1, below, gives the numbers of television-owning homes with a videocassette recorder in Western European countries in 1987. (Waterson, 1990) It shows that in over half the countries, over a third of homes contained a videocassette recorder. In the USA in the same year, over half of television owning homes possessed a videocassette recorder. (The Economist, 1987).

Figure 1. Television in Western European Countries 1987

Country	Homes with T.V. Sets	Homes with VCR (As % of TV homes)	Homes with Cable (As % of TV homes)
Austria	92	17	15
Belgium	97	22	89
Denmark	95	34	20
France	96	31	0.2
Germany	98	44	12
Ireland	94	44	35
Italy	94	14	0.1
Neth'ds	98	44	65
Norway	94	37	26

Spain	96	28	-
Sweden	97	33	-
Switz'd	86	31	56
U.K.	98	60	1

Britain has the highest ownership of videocassette recorders in Europe. A recent survey indicated that over a four year period, the percentage of British television viewers owning a videocassette recorder had increased from 44% in 1986 to 70% in 1989. The percentage of viewers with children who owned a videocassette recorder was even higher at 85%. Only 2% of British viewers had access to a videodisc player, cable television or a satellite receiver in 1989. (McLaughlin and Svennevig, 1990).

A survey carried out in 1988, of Open University undergraduate students (Crooks and Kirkwood, 1989) revealed that over three-quarters of them (77%) owned videocassette recorders. Small numbers of students had access to a videocassette recorder in places other than their homes such as at work, or in the homes of family or friends. About 14% had no access to a videocassette recorder at all. By now the proportion of students with videocassette recorders will be close to the proportion who had television sets in the early years of the University. Course teams whose courses will be presented to students in 1992 are already designing television programmes on the assumption that they will be recorded off-air and viewed on videocassette.

The increasingly widespread ownership of videocassette recorders could be seen as a threat to broadcasting in that viewers might spend their time watching pre-recorded videocassettes. However, studies have shown that the primary use of videocassette recorders is to "time-shift", that is, record broadcast programmes for viewing at a more convenient time. The evidence points to an increase in the amount of broadcast television seen by people who own a videocassette recorder. (Mc Laughlin and Svennevig, ibid)

At the Open University the total viewing rate for broadcast television programmes has remained constant at about 60% for the last decade in spite of a deterioration in the quality of broadcast transmission times. This can be attributed to the fact that about 90% of broadcast programmes viewed are recorded off-air by students and are watched at a more convenient time. (Crooks and Kirkwood, ibid.)

Home videocassette recorders are the most explosive area of new television technologies. Others such as cable television, broadcasting by satellite and videodisc have, on a world-wide scale, achieved nothing like the penetration into homes of the videocassette recorder. At this rate, by the mid 1990's ownership of videocassette recorders will reach complete saturation of television households in many developed countries .

Implications for television design

Rather than surrender in the face of the challenge from videocassettes, educational broadcasters could follow the maxim: "If you can't beat'em join em". This will involve a new approach to educational television design which separates the issues of pedagogic characteristics and method of distribution.

It is possible to locate television teaching strategies along a dimension ranging from video-format programmes at one extreme, to broadcast-format programmes at the other extreme.

- Video-format programmes use production styles that exploit the facilities of videocassette recorders. For example, the programme might be structured with "Stop tape" captions or organised into very short unrelated sequences that can be interspersed with other forms of study.

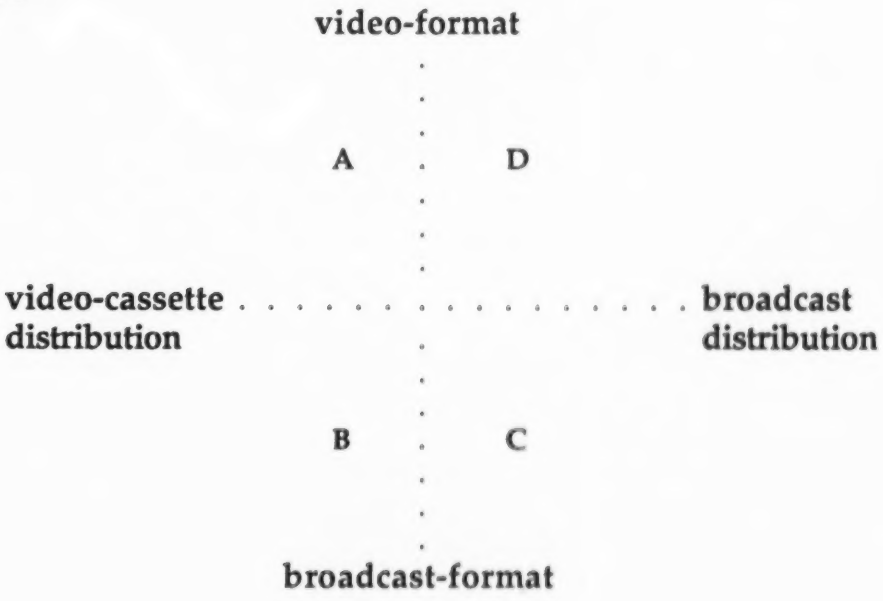
- Broadcast-format programmes use production styles that are appropriate to a single viewing and a mass audience. For example, a continuous narrative would be more appropriate than a series of short, unrelated sequences.

- Dual-purpose programmes use production styles that make the programme worth watching just once as a broadcast but also benefit from recording for viewing on videocassette. For example, some real-life observation material can be followed by an analytical commentary which informs the broadcast viewers but acts as feedback for the videocassette viewers who have attempted to analyse the observation material for themselves.

Provided the teaching aims and target audience are made clear, broadcast-format programmes can be distributed on videocassette and video-format programmes can be distributed by broadcasts for students to record off air and watch later, on videocassette.

A way of considering the interaction between the two issues of pedagogic characteristics and method of distribution is illustrated in Figure 2 below.

Figure 2



Circumstances A, B and C are all found occurring at the Open University now:

A : video-format - distributed by videocassette.
B : broadcast-format - distributed by videocassette.
C : broadcast-format - distributed by broadcast.

In 1992 the first examples of circumstance D : video-format distributed by broadcast for students to record off air and view in recorded form, will be transmitted.

How will these programmes differ from traditional broadcasts? Here are some possibilities:

- The programme might consist of three unrelated sequences that are intended to be recorded and used at different points in the course.
- There may be an unobtrusive index number in the top right hand corner to help the students locate the frames that interest them.
- The programme may contain suggestions in the commentary or in a captions to "stop the tape and consider this question".
- Very dense and difficult information may be presented at a fast pace on the assumption that students will be able to replay sections to clarify points they have not understood.
- Practical skills, such as engineering skills, may be taught assuming students could practise as they watched the recorded version or, perhaps, freeze-frame a critical close-up.
- The programme may be frequently interrupted by "discussion points", assuming the recorded version will be watched and discussed in a group.

These ideas may sound rather foreign at present. Broadcasters might argue that the viewing public would find this kind of television unacceptable. However, in Britain, the BBC has already begun, as part of its general broadcasting, to try out production styles that could be categorised as "dual purpose" broadcast/video format. It may not be long before the expectations of the general public about what an educational broadcast looks like and what use they intend to make of it is completely changed.

Scenario for Educational Television in the 1990's

An attempt to predict the impact of the vidocassette medium on educational television in the 1990's runs the risk, as with any forecast, of being wrong. Predictions by many forecasters that videodisc players would be the video player chosen by most households were, for a variety of reasons, wild of the

mark (Klopfenstein, 1986). However, this scenario is intended only to provoke ideas as to future directions for educational television research, so there are unlikely to be dire consequences, if events turn out differently.

In the 1990's educational television material will be designed to both convey visual information and provide visual evidence for analysis on the assumption that students will be able to stop, start and replay the material. No longer will producers have to consider television as an ephemeral medium, tied to fixed schedules and packed into a time slot of uniform length Television will make educational demands on students of comprehension and analysis that have not been possible before and it will become possible to integrate it with other media such as print.

Broadcasting and videocassettes will be seen as alternative ways of distributing television that is intended to be viewed in its recorded form on tape; financial or marketing considerations will affect this decision. The television material will not differ on account of its distribution: it will be designed for interactive use by students.

Implications for educational television research

Researchers who have tried to develop a theoretical understanding of the ways in which viewers respond to television viewed on a videocassette recorder have identified the key issues as activity and control on the part of the viewer. For example, a typology of audience activity has been used to examine videocassette recorder use. Findings indicated that audiences are active in a range of ways, from planning what to record, to discussing what they have seen (Levy, 1987). Another study has examined the influence of the viewer's psychological locus of control (measured as external or internal on a standard personality test) on their learning from interactive television (Gagnon, 1986).

These researchers are indicating a fruitful direction for educational television research: to develop a model of the ways in which students interact with television that helps to inform television design. Alternatively, different interactive television designs might be evaluated for their effectiveness in achieving different teaching purposes. The former approach would be most appropriate in the early stages of the transformation of television from traditional broadcast format to more interactive video formats. However, in an educational institution like the Open University, with a very large output of educational television, there are likely to be enough examples of innovatory interactive television designs to make the second approach feasible.

Television may, in the 1990's, at last achieve its potential as an instructional medium. It is as much a challenge to researchers, as to producers, to identify new ideas and successful approaches and thus bring the change about.

References

Crooks, B. and Kirkwood, A. (1989) "VCR Access and Television Viewing Rates - Undergraduate Students in 1988". Report No. 26. Student Research Centre. Institute of Educational Technology, The Open University, Walton Hall, Milton Keynes, MK7 6AA (mimeo).

Economist (1987) "Video Crazy" June 20 p.43.

Gagnon, D. (1986) "Interactive Television. The Influence of User Control and Interactive Structure". Paper presented at the International Television Studies Conference. London 1986. ED283510.

Klopfenstein, Bruce C. (1986) "Forecasting the Market for New Communication Technology: The Home Video Player experience". Paper presented at the Annual Meeting of the International Communication Association. Chicago 1986. ED277355.

Levy, M.R. (1987) "VCR Use and the Concept of Audience Activity". Communication Quarterly. Vol.35, No.3, p.267-275.

McLaughlin, C. and Svennevig M. (1990) "Attitudes to Television in 1989". Research Department Independent Broadcasting Authority. Information Office. IBA Public Affairs Division, 70, Brompton Road, London (mimeo).

Waterson, M. (1990) Marketing Pocket Book. The Advertising Association, London. p.125.

March 1990

Programme on Learner Use of Media

This paper is included in the Programme's

ANNOTATED BIBLIOGRAPHY OF EDUCATIONAL MEDIA

which is available on-line from the IET server.
Printed copies, or copies on computer discs of various formats are available from Hansa Solanki in IET (ext: 2909)

The bibliography with abstracts is large (almost 300 items). The following is the list of contents showing the sections under which papers have been organised. You may order either the whole bibliography or a selection of individual sections.

A- BROADCASTING
- (1) Broadcasting Policy:
  - (1a) Allocation of Resources
  - (1b) Use of Video vs Broadcast
    - (i) Broadcast and Video Access Backup Schemes
  - (1c) Radio
  - (1d) Cable and Satellite
  - (1e) European Policy
- (2) Broadcasting Evaluation
- (3) Specific Broadcasting Issues:
  - (3a) Transmission Times
  - (3b) Setting Assignments on Broadcast Material
  - (3c) Using Broadcast Material
  - (3d) Case Studies and Documentaries
  - (3e) 50 minute Broadcast Programmes
- (4) Broadcast Surveys and Annual Surveys of New Courses
- (5) The Open University/BBC relationship

B-MULTI-MEDIA AND COURSE DESIGN
- (1) The Open University Experience
- (2) New Technology and Course Design
- (3) Using Multi-media

B1-RADIO AND AUDIO
- (1) Policy Issues Related to Radio
- (2) Characteristics of Radio and Course Design
- (3) Analysis of Radio
- (4) Using Radio
- (5) Audio Vision
- (6) Audio-cassettes

B2- TELEVISION
- (1) Policy issues related to Broadcast TV
- (2) Characteristics of Television and Course Design
- (3) Analysis of Television
- (4) Using Television

B3-VIDEO
- (1) Video and Broadcast Television
  - (1a) Broadcast and Video Access Backup Schemes
- (2) Characteristics of Video and Course Design
- (3) Analysis of Video
- (4) Using Video

B4-TEXT
- (1) Design and Use of Broadcast notes

(2) Text processing
(3) Design and Use of Texts in Distance Education

C-COMPUTING AND COMMUNICATIONS TECHNOLOGY
(1) Computing or Communications?
(2) Computers
(2a) Access
(2b) Home computing evaluation project
(2c) Effect of computing on particular groups
(2d) Computer Assisted Learning (CAL)
(2e) Hypertext
(3) Communications
(3a) Computer conferencing
(3b) CEEFAX/TELETEXT
(4) Multimedia Systems

C1-INTERACTIVE VIDEO
(1) Characteristics of Interactive Video
(2) Analysis of Interactive Video
(3) Using Interactive Video

C2-CABLE AND SATELLITE
(1) Cable TV
(2) Satellite Policy
(3) Satellites in Europe (and JANUS project)
(4) Satellites in the Commonwealth

C3-CYCLOPS
(1) Characteristics of CYCLOPS
(2) Analysis of CYCLOPS
(3) Using CYCLOPS

D1-EVALUATION
(1) General Surveys of Courses
(2) Evaluation of AV Media Components of Courses
(3) Evaluations of Individual Programmes

D2-STUDENT USAGE
(1) Transmission Times and Viewing Opportunity
(2) Setting Assignments on Broadcast Material
(3) Learning from Broadcasts
(4) Utilisation

D3-RESEARCH METHODOLOGY
(1) Evaluation in Distance Learning Systems
(2) Open University Broadcasting Research
(3) Approaches to Research
(3a) Decision Oriented Research
(3b) Formative and Summative Evaluation
(3c) Developmental Testing of AV Material
(3d) Contextual Evaluation
(3e) Survey Methods
(3f) Protocol Analysis
(4) Investigating Learning from Media
(5) Research Support

D4-RESEARCH PLANS OF AVMRG/PLUM
(1) AVMRG
(2) PLUM

D5-OTHER INSTITUTIONS
(1) Consultancies on Policy, Organisation and Evaluation
(2) Use of AV Media in Other Institutions
(3) Reports on visits/workshops and conferences